

Smith River Watershed 2011 Summary Report

October 19-28, 2010

State of California

Natural Resources Agency

Department of Fish and Game

Heritage and Wild Trout Program



Prepared by Jeff Weaver and Stephanie Mehalick

Introduction:

The Smith River watershed, located in the Siskiyou Mountains of the Klamath River Province northeast of Crescent City, CA, encompasses a drainage exceeding 500,000 acres (Figure 1). The entire watershed is undammed and free-flowing and over three hundred miles are designated under the National Wild and Scenic Rivers Act, including the main-stem Smith River; North, South, and Middle forks; and 38 tributaries. Native salmonids present in the system include Chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), coastal rainbow trout/steelhead (*O. mykiss irideus*), and coastal cutthroat trout (*O. clarki clarki*). In 2010, the California Department of Fish and Game (DFG) Heritage and Wild Trout Program (HWTP) conducted Phase 1 initial resource assessments within the Smith River drainage to evaluate Heritage and Wild Trout designation potential for its populations of both coastal rainbow trout/steelhead and coastal cutthroat trout. The HWTP is mandated to annually identify waters to be managed as wild trout fisheries. Wild Trout Waters are those that support self-sustaining trout populations, are aesthetically pleasing and environmentally productive, provide adequate catch rates in terms of numbers or size of trout, and are open to public angling (Bloom and Weaver 2008). Wild Trout Waters may not be stocked with catchable-sized hatchery trout. Heritage Trout Waters are a sub-set of Wild Trout Waters and highlight wild populations of California's native trout that are found within their historic drainages. The HWTP utilizes a phased approach when evaluating waters for potential designation and Phase 1 assessments are designed to gather baseline information on fish species composition, relative abundance and size of fishes (specifically trout), public access, aesthetics of the fishery, basic habitat attributes, and whether the trout present are of wild or hatchery origin. The 2010 Smith River Phase 1 assessment included:

1. Direct observation snorkel surveys in two tributaries to better understand species composition, size class structure, and fish abundance.
2. Hook and line angling assessments in five tributaries to evaluate catch rates, species composition, and catch sizes.
3. Collaboration between state, federal, and non-profit agencies to establish working relationships with stakeholders and learn about local issues within the watershed.
4. A reconnaissance of the watershed to aid in future survey strategy and to identify angler access locations.

Figure 1. Vicinity map of the Smith River drainage.



Methods:

Direct observation surveys were conducted by HWTP personnel (from Headquarters and Northern Region) and DFG staff (Northern Region) using snorkeling methods, an effective survey technique in many small streams and creeks in California and the Pacific Northwest (Hankin and Reeves 1988). Surveys were conducted on Hardscrabble and Copper creeks (Figure 2) between October 19 and 21, 2010. The United States Forest Service (USFS) Six Rivers National Forest has conducted extensive fisheries and habitat assessments throughout the watershed as part of the monitoring plan for the Smith River National Recreation Area (NRA); these tributaries were selected in coordination with the USFS and DFG Northern Region to assist with their efforts and provide information on waters not recently surveyed.

Hardscrabble Creek was surveyed at nine locations (Sections 110-910) from the confluence with the Middle Fork Smith River upstream approximately six miles (Figure 2). Copper Creek, tributary to Rowdy Creek, was surveyed on October 21, 2010 at four locations (Sections 110-410) from the headwaters downstream approximately two miles (Figure 2). Sections were spaced approximately every one-half mile and the start of each section was selected at random. Specific section boundaries were located at distinct breaks in habitat type and/or stream gradient. Surveys were conducted in an upstream direction with either one or two divers; the number of divers per survey section was determined based on wetted width, water visibility, and habitat complexity.

Divers maintained an evenly spaced line perpendicular to the current and counted fish by species. All observed trout were further categorized and counted by size class. Size classes were divided into the following categories: small (< 6 inches); medium (6-11.9 inches); large (12-17.9 inches); and extra-large ($\geq$ 18 inches).

Divers were instructed in both visual size class estimation and proper snorkel survey techniques prior to starting the survey (establishing a dominant side, determining the extent of their visual survey area, how and when to count (or not count) fish observed, safety considerations, etc.). For each section, surveyors measured section length along the thalweg, water and air temperature, average wetted width and water depth, and water visibility. Habitat type (flatwater, riffle, or pool) was identified following Level 2 protocol as defined in the California Salmonid Stream Habitat Restoration Manual (Flosi et al. 1988). Representative photographs were taken and GPS coordinates were recorded for the section boundaries. To calculate estimates of abundance, the HWTP summed all observed trout by species in all sections and divided by the total survey length (this density estimate was calculated individually for both creeks and was expressed in fish per mile).

Angling assessments were conducted by HWTP personnel on Hardscrabble, Patrick, Little Jones Creek, Mill Creek, the Siskiyou Fork, and Lake Earl/Talawa

between October 21 and 28, 2010 (Figure 3). Anglers recorded total fishing effort (hours) and the number of fish caught by species and size class (using size classes as defined above for direct observation surveys).

Figure 2. Map of 2010 direct observation survey sections on Hardscrabble and Copper creeks.

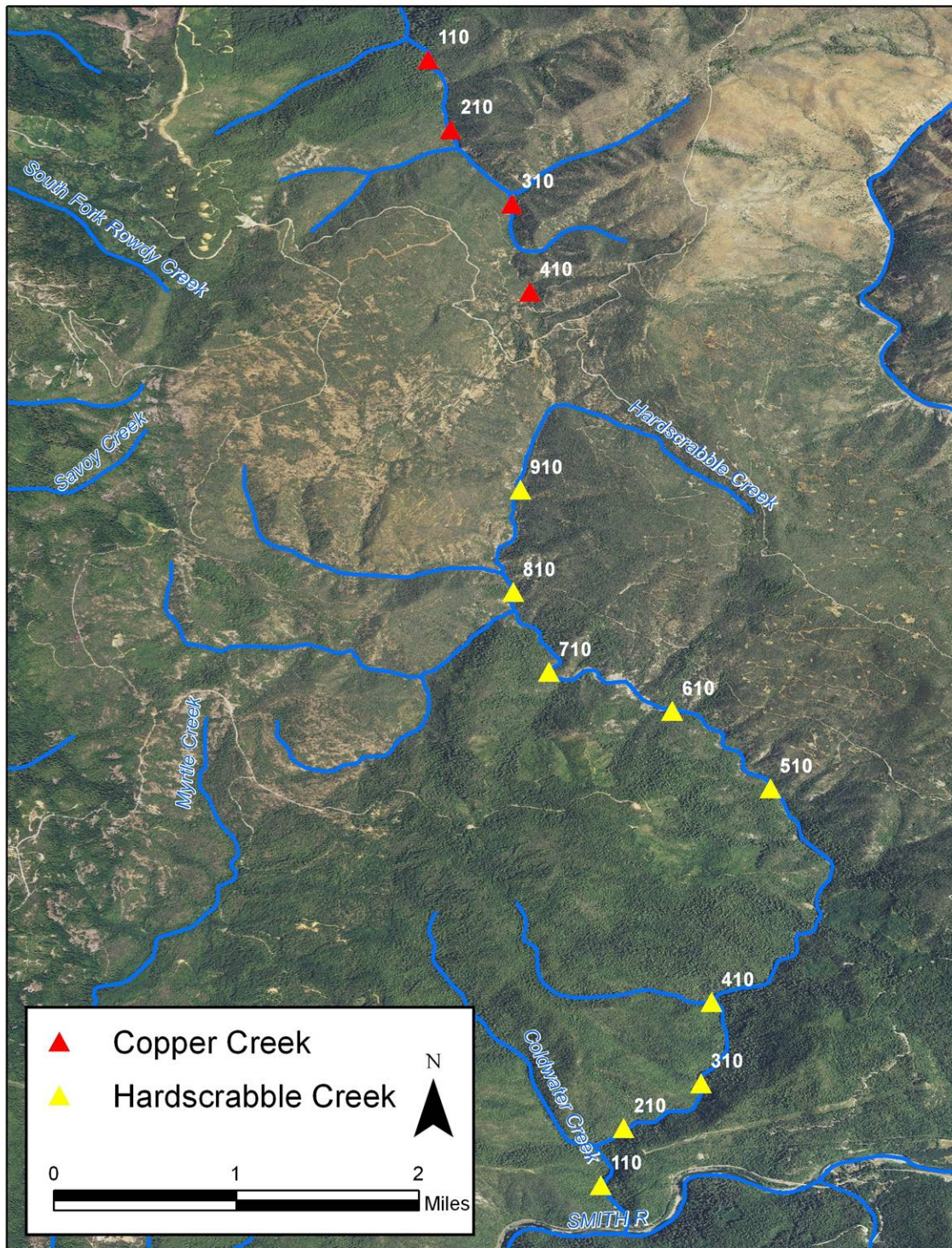
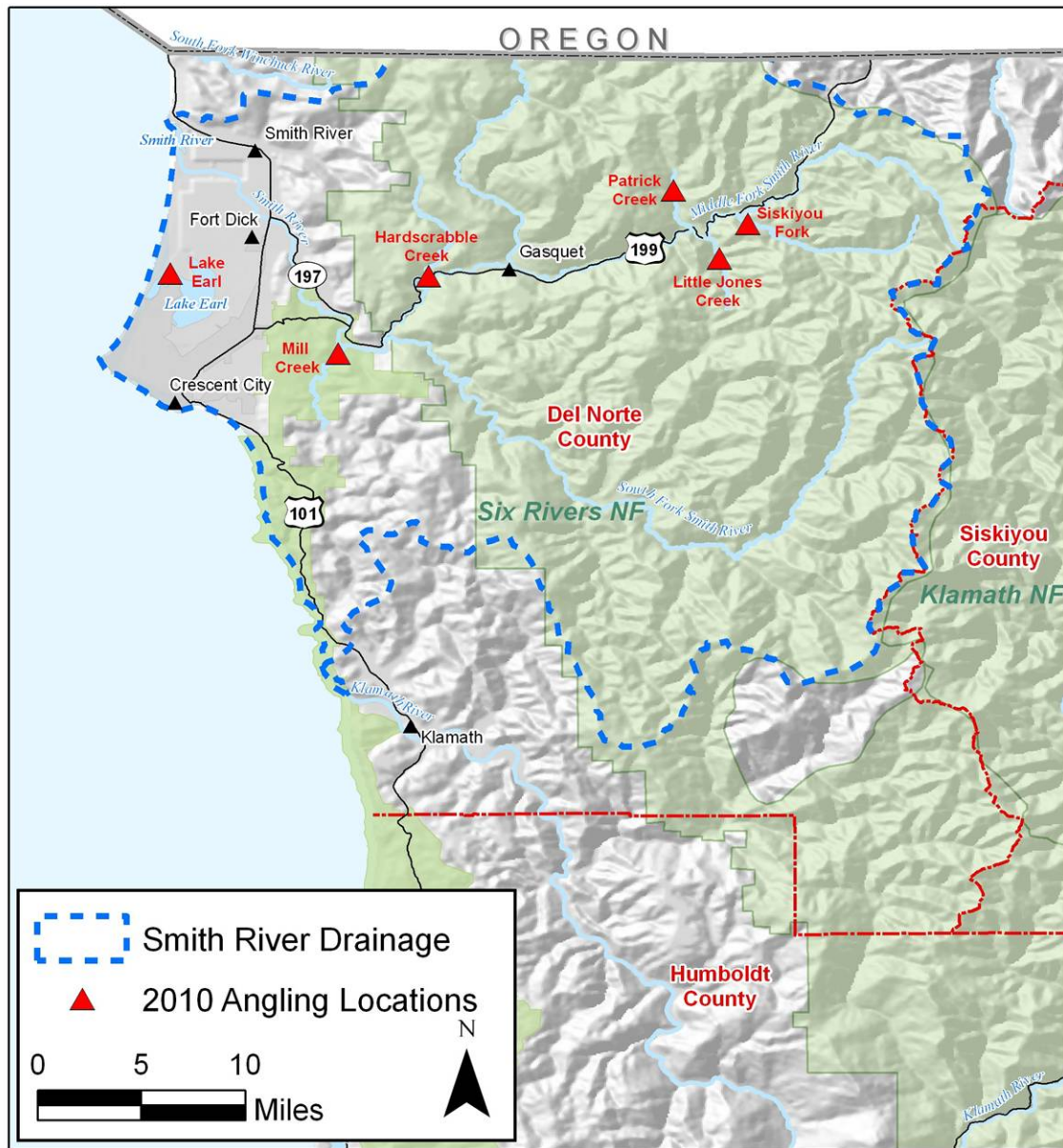


Figure 3. Map of 2010 hook and line survey locations on Hardscrabble, Patrick, Little Jones Creek, Mill Creek, the Siskiyou Fork, and Lake Earl/Talawa.



Results:

Hardscrabble Creek is a medium-gradient stream with substrate dominated by cobble, boulder, and gravel (Figure 4). Bedrock was present, especially in steeper-gradient areas of the creek. Water temperature ranged from 11 °C to 15 °C and air temperature was between 8 °C and 18 °C. A total of 1090.1 feet of stream habitat was surveyed with an average wetted width of 19.8 feet and an average water depth of 0.9 feet. Among the nine sections, 95% was flatwater (mostly step runs) and 5% was pool habitat. Between Sections 610 and 710, there was a dry segment of the creek due to subterranean flow. A total of 93 coastal rainbow trout and three coastal cutthroat trout were observed (Table 1). No other fish species were observed. Estimated abundance of coastal rainbow trout ranged from zero fish per mile (Section 910; flatwater habitat) to 1166 fish per mile (Section 310; flatwater habitat) with an average abundance of 450 fish per mile. Size class distribution of coastal rainbow trout consisted of 85% small and 15% medium-sized fish. Coastal cutthroat trout abundance ranged from zero fish per mile (Sections 410-910; flatwater habitat) to 56 fish per mile (Section 210; 40% flatwater and 60% pool) with an average abundance of 15 fish per mile. Section 210 consisted of both flatwater and pool habitat because there was no distinct break between the two units. Size class distribution of coastal cutthroat trout included two small and one medium-sized fish. No trout larger than 12 inches was observed. Other aquatic species observed in Hardscrabble Creek included 13 adult foothill yellow-legged frogs (*Rana boylei*), two Pacific giant salamanders (*Dicamptodon tenebrosus*), two aquatic garter snakes (*Thamnophis atratus*), and numerous crayfish (not identified to species).

Table 1. Hardscrabble Creek 2010 direct observation survey data.

Section number	Section length (ft)	Species	Number of fish observed			Estimated density (fish/mi)
			Small < 5.9"	Medium 6" - 11.9"	Totals	
110	106.0	coastal rainbow trout	17	1	18	897
		coastal cutthroat trout	0	1	1	50
210	95.0	coastal rainbow trout	7	4	11	611
		coastal cutthroat trout	1	0	1	56
310	99.6	coastal rainbow trout	19	3	22	1166
		coastal cutthroat trout	1	0	1	53
410	239.0	coastal rainbow trout	33	3	36	795
510	75.2	coastal rainbow trout	1	1	2	140
610	67.0	coastal rainbow trout	0	1	1	79
710	91.6	coastal rainbow trout	1	1	2	115
810	222.7	coastal rainbow trout	1	0	1	24
910	94.0	n/a	0	0	0	0

Figure 4. 2010 Hardscrabble Creek site photographs.

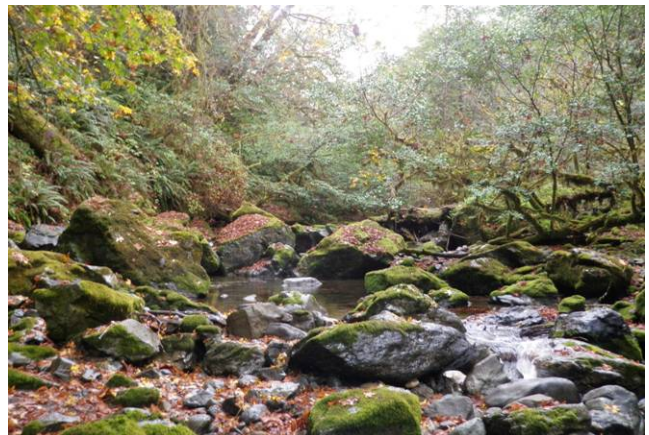


Copper Creek is a medium-gradient stream with flatwater habitat (mostly step-runs) separated by short cascades and riffles (Figure 5). Substrate was dominated by boulder, cobble, and gravel. A few portions of the streambed were dewatered due to subterranean flow. Water temperature was 10 °C and air temperature was 16 °C. A total of 200.7 feet of stream habitat was surveyed with an average wetted width of 10.2 feet and an average water depth of 0.6 feet. The four sections were comprised of 73% flatwater and 27% pool habitat. A total of 10 small-sized coastal rainbow trout were observed (Table 2). No other fish species were observed. Estimated abundance of coastal rainbow trout ranged from zero fish per mile (Sections 310 and 410; pool habitat) to 599 fish per mile (Section 110; flatwater habitat) with an overall estimated density of 263 fish per mile. The four sections surveyed were located in the upper portion of the creek and species composition, size class structure, and fish densities may be different lower down in the system. Due to survey logistics and time constraints, the HWTP did not survey the lower two miles of Copper Creek in 2010.

Table 2. Copper Creek 2010 direct observation survey data.

Section number	Section length (ft)	Species	Number of fish observed			Estimated density (fish/mi)
			Small < 5.9"	Medium 6" - 11.9"	Totals	
110	52.9	coastal rainbow trout	6	0	6	599
210	93.5	coastal rainbow trout	4	0	4	226
310	22.0	n/a	0	0	0	0
410	32.3	n/a	0	0	0	0

Figure 5. 2010 Copper Creek site photographs.



An angling assessment was conducted on five tributaries and two lakes between October 21 and 28, 2010 (Figures 3 and 6; Table 3). Catch rates ranged from zero fish per hour (Patrick Creek, Mill Creek, and Lake Earl/Talawa) to nine fish per hour (Little Jones Creek). Captured fish included 60% small and 40% medium-sized coastal rainbow trout/steelhead and 45% small and 55% medium-sized coastal cutthroat trout. No fish larger than 12 inches was captured. Adult Chinook salmon were visually observed at the confluence of Patrick and Shelley creeks during the angling effort.

Table 3. Summary of 2010 angling data from the Smith River drainage.

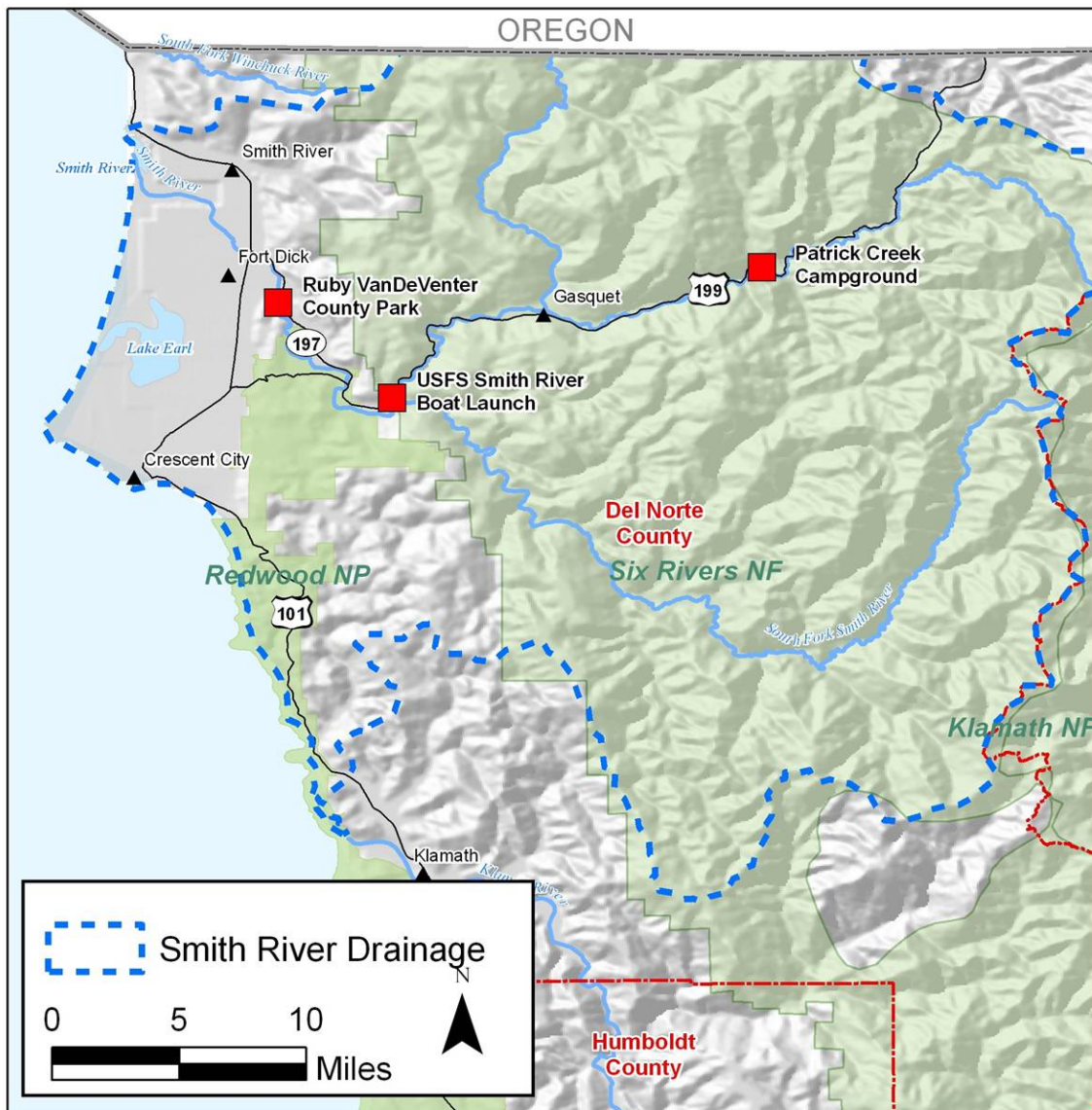
Water	Survey date	Effort (hours)	Species	Number of fish caught			Catch rate (fish per hour)
				Small < 5.9"	Medium 6" - 11.9"	Total	
Hardscrabble Creek	10/21/2010	1.00	coastal rainbow trout	3	2	5	5.0
		1.25	coastal rainbow trout	0	1	1	0.8
Hardscrabble Creek average							2.9
Siskiyou Fork	10/26/2010	1.00	coastal rainbow trout	3	2	5	5.0
		2.67	coastal rainbow trout	1	0	1	0.4
		3.00	coastal rainbow trout	0	1	1	0.3
Siskiyou Fork average							1.9
Little Jones Creek	10/26/2010	0.50	coastal cutthroat trout	0	1	1	2.0
		1.00	coastal cutthroat trout	4	5	9	9.0
		1.00	coastal cutthroat trout	1	0	1	1.0
Little Jones Creek average							4.0
Patrick Creek	10/26/2010	0.50	n/a	0	0	0	0.0
Patrick Creek average							0.0
Mill Creek	10/27/2010	1.50	coastal rainbow trout	0	1	1	0.7
		1.00	coastal rainbow trout	5	1	6	6.0
		1.50	n/a	0	0	0	0.0
Mill Creek average							2.2
Lake Earl/Talawa	10/28/2010	1.00	n/a	0	0	0	0.0
		2.17	n/a	0	0	0	0.0
		2.00	n/a	0	0	0	0.0
Lake Earl/Talawa average							0.0

Figure 6. Photographs of Smith River drainage 2010 hook and line survey locations on Patrick Creek (top left), Siskiyou Fork (top right), Lake Earl/Talawa (bottom left), and Mill Creek (bottom right).



A reconnaissance of the Smith River watershed was conducted throughout the October 2010 survey effort to aid in future survey planning and to identify angler access points and potential locations for Angler Survey Box (ASB) installation. Voluntary fishing information from ASBs provides further insight into a fishery, including angling pressure, catch rates, catch sizes, angler satisfaction, and angler preferences. ASBs are an inexpensive tool to monitor angling throughout a watershed year-round. The Smith River provides a popular steelhead and salmon fishery and it appears the majority of angling occurs along the Highway 199 corridor with numerous pullouts providing angler access. Drift boats are also common on the Smith River. Due to relatively spread-out angler access throughout the system, it is recommended that ASBs be installed at a few public areas with existing infrastructure (parking facilities and information kiosks) along Highway 199. Such sites may include the USFS Patrick Creek Campground, the USFS Smith River boat launch, and/or Ruby Van DeVenter County Park (Figure 7). Additional ASB sites could be located at multiple roadside access points along the South Fork Smith River to broaden the geographic scope of ASB data collection within the drainage.

Figure 7. Potential locations for ASB installation in the Smith River drainage.



Discussion:

The Smith River watershed falls within state (Jedediah Smith State Park), federal (USFS Six Rivers National Forest; Bureau of Land Management; Jedediah Smith National Park), local (Ruby Van DeVenter County Park) and private lands. The Smith River is the longest National Wild and Scenic River in the United States and is currently being managed by federal, state, and local agencies for its recreational opportunities (including angling, hiking, white water rafting, mountain biking, hiking, etc), fisheries, scenic beauty, water quality, and wildlife values. The Smith River NRA encompasses over 450 square miles within the Six Rivers National Forest and was created to protect the ecological diversity of the watershed, recreational opportunities, and sustained productivity of natural resources (Smith River National Recreation Area Act, 1990). Section 5 of the NRA identifies the need to develop a monitoring plan to gather fisheries data from sub-watersheds within the drainage; the 2010 HWTP surveys were developed in consultation with the USFS Gasquet Ranger District in an effort to collaborate on resource assessment and assimilate data.

The Smith River watershed contains self-sustaining (wild) populations of both coastal rainbow trout/steelhead and coastal cutthroat trout within their native ranges. However, it is worth noting that both the steelhead and Chinook salmon fisheries are supplemented with hatchery allotments of fingerling fish from the Rowdy Creek Fish Hatchery, largely to support high levels of angling pressure on the main-stem Smith River (from the confluence of the Middle and South forks downstream to the mouth). Nonetheless, the Smith River meets multiple criteria for designation as a Heritage and Wild Trout Watershed and merits further HWTP evaluation of its potential for designation as such.

The HWTP recommends moving to a Phase 2 candidate water assessment of the Smith River watershed. HWTP Phase 2 assessments generally occur over a multi-year period and provide a comprehensive evaluation of the fishery, habitats, and angler use, including estimates of trout abundance and delineation of species distribution. As part of a Phase 2 assessment in the Smith River watershed, the HWTP recommends the following:

1. Conduct fisheries and habitat assessments throughout the Smith River drainage to delineate the distribution, size class structure, and life history patterns of coastal rainbow trout/steelhead and coastal cutthroat trout.
2. Assist with the Mill Creek Fisheries Monitoring Program summer population estimates (McLeod and Howard, 2010).
3. Collaborate with USFS, DFG local offices, Smith River Alliance, recreational users, and other stakeholders involved in the conservation of the Smith River watershed.

4. Install ASBs at popular angler access locations to better understand angler use, catch rates, catch sizes, angler preferences, and angler satisfaction.

References:

Bloom, R., and J. Weaver. 2008. The California Heritage and Wild Trout Program Handbook (Draft). State of California Natural Resources Agency. Department of Fish and Game. Heritage and Wild Trout Program. Rancho Cordova, CA.

Hankin D.G., and G.H. Reeves. 1988. Estimating total fish abundance and total habitat area in small streams based on visual estimation methods. Canadian Journal of Fisheries and Aquatic Sciences. 45:834-844.

Flosi, G., S. Downie, J. Hopelain, M. Bird, R. Coey and B. Collins. 1998. California Salmonid Stream Habitat Restoration Manual. 3rd Edition. Vol. 1. State of California Resources Agency. Department of Fish and Game. Inland Fisheries Division.

McLeod, R. and C. Howard. 2010. Mill Creek Fisheries Monitoring Program 2009 Final Report. Mill Creek Fisheries Monitoring Program. Crescent City, CA.

Smith River National Recreation Act. 1990. US Code Title 16; Chapter 1; Subchapter CXIII; Section 460bbb. 101st Congress, 2nd session.